## Section 5 Benefits of a Countywide Plan

Greenways provide numerous benefits as incentives for citizen endorsement. The single greatest benefit of greenways is summed up in one word: ***connections***. The earliest recognizable benefits of greenways were pedestrian-transportation oriented. The environmental movement of the 1970's recognized the ecosystem benefits of preserving natural systems as another key benefit of greenways. Today, the recreation benefits and economic advantages make greenway planning and open space preservation inviting to most communities. There are many multifaceted tangible and intangible benefits associated with greenways, however, the single greatest benefit is the re-establishment of connections that enhance our citizens' quality of life.

Greenways connect people to a variety of people, places, things, and events. They connect people to neighborhoods, and neighborhoods to communities. They connect people to places such as schools and parks; they provide outdoor recreation for people, and migration corridors for animals; and they connect our present day activities to past historical events. They even connect us to ourselves. The spiritual aspects of connecting esoteric memories within peaceful settings help provide us with the necessary peace of mind to contend with some of today's circumstances. Whatever the reasons may be, greenways connect us and benefit us in a variety of ways.

"Many greenways are implemented by local communities to control flooding, improve water quality, protect wetlands, conserve habitat for wildlife, and buffer adjacent land uses. Greenways typically incorporate varying types and intensity of human use, including trails for passive recreation and alternative transportation, and low intensity park facilities, such as open play fields. They have also been shown to increase the value of adjacent private properties as an amenity to traditional forms of land development."[5] These and other benefits of a greenway network are described below.

### 5.1 Economic Benefits of Greenways

Greenways provide numerous economic benefits, however, the non-monetary value of preserving open spaces should continue to be the principle goal of the Greenway Master Plan. The intrinsic value of greenways to environmental protection cannot be overstated as vital to community sustainability. The true nature of any benefit must be measured in its applicability as a positive economic benefit for a community. Because environmental benefits are not typically defined as economic variables, the environmental community created the language of ecosystem services to help quantify the cost of beneficial environmental services for communities. These will be discussed further under environmental benefits.

The most easily recognizable economic benefits of greenways are manifest in higher real property values. Other benefits include attracting corporate relocations and retention of existing corporations, increases in tourism, ecotourism, and recreation related revenues, and reductions in public services and infrastructure expenses. These tangible benefits cumulatively promote the many positive economic benefits when communities invest in greenways. The incorporation of greenways and trails into the matrix of tourism related enterprises would significantly enhance

[5] Roanoke Valley Greenway Master Plan, p.13.

the visitor experience and resident quality of life within James City County and the surrounding Williamsburg area.

5.1.a Real Property Values

Of the many economic benefits, increased real property values are well documented. In virtually every instance, greenways have contributed from 5 to 20% to the value of homes and properties located adjacent to greenways. In turn, these increases contribute to tax revenues that help offset greenway acquisition costs and trail development.

- In a new development in Raleigh, North Carolina, new lots situated along greenways were priced $5,000 higher than comparable lots off the greenway.[6]
- A study of property values near Boulder, Colorado, noted that housing prices declined an average of $4.20 per foot of distance from the greenbelt up to 3,200 feet. In one neighborhood, the value was $10.20 for each foot.[7]
- In the vicinity of Philadelphia's Pennypack Park, property values correlate significantly with proximity to the Park. In 1974, the Park accounted for 33 % of the land value within 40 feet of the park, 9 % at 1,000 feet, and 4.2 % at a distance of 2,500 feet.[8]
- Homes sales along the W. & O.D. Trail in Northern Virginia average 10% higher than those of comparable homes a couple of blocks away.
- A land developer from Front Royal, Virginia, donated a 50-foot wide seven-mile easement for the Big Blue Trail in Northern Virginia after volunteers from the Potomac Appalachian Trail Club approached him to provide a critical trail link along the perimeter of his (proposed) subdivision. The developer recognized the amenity of the trail and advertised that the trail would cross approximately 50 parcels. All tracts were sold within four months (American Hiking Society, 1990).
- Other examples are documented in Appendix 12.2, The Effect of Trails on Property Values and Public Safety.

The net effect of increased property values translates into increased property tax revenues for local government. Many arguments made for open space acquisition claim the investment is recaptured, in part, due to increased real property values on adjacent property. A similar argument can be made that increased real property values support the cost to develop trails.

- If the average home value in James City County is $180,000, and the value of the home increased 7% as a direct result of a greenway, the property value would increase by $10,500. The net annual increase using the current tax rate of $.0087 is $91.35 per home. Other market indicators could be positively affected as well, increasing the total net economic gain.
- The average lot width for most single-family homes in a subdivision is 150 feet. Taking the cost of $91.35, divided by the width of a lot, equates to $0.61 per lineal foot. The average cost of an improved trail, adjusted over the 20-year life of the trail, approximates to $1.00 per lineal foot per year. This demonstrates that the cost of trail development can be offset almost 2/3 by homes located directly along a trail. If we include other homes

[6] Roanoke Valley Greenway Master Plan, p.14.
[7] National Park Service, Rails and Trails Conservancy, Resource Book, p.1-3.
[8] Ibid, p.1-4.

not adjacent to the trail that also increase in value as a result of the trail, it could be estimated that the entire cost of the trail could be underwritten by increases in real estate tax assessments.

Example:

1. Assuming a piece of property was purchased for open space protection as a greenway:
   a) 30 acres of property at $6,500 assessed value for greenway acquisition
   b) Total acquisition cost is $195,000 (funds from the open space account)
   c) Development of the greenway increases the value of nearby properties by 5%
   d) Homes on 1-acre lots valued at $150,000 each, will be affected by the greenway
   e) Property tax rate is $0.87 per $100 of assessed value

2. Increased property tax revenues could be estimated as follows:
   a) Present property tax on 30 homes:
   30 x $150,000 = $4,500,000
   $4,500,000 x $.0087 (tax rate) = $39,150
   b) Increased property tax due to greenway
   $39,150 x 5% = $1,957.50
   c) Taxes lost for greenway property
   30 acres x $6,500 x .0087 (tax rate) = $1,696.50
   d) Net annual increase in property tax revenues after acquisition of the greenway:
   $1,957.50 - $1,696.50 = $261.00

In some cases, open space properties can be acquired through development proffers when developers comply with the 40% mandatory open space zoning requirement. Other land protection strategies could include conservation easements placed on the open space, with conditions allowing greenway access and trail development. In many instances, real estate taxes generated from increased property values resulting from protection of adjacent open spaces can offset the cost to install the trail system. There are other factors, such as state and local tax revenues, which help justify the expense of developing trails.

- In 1994, the Maryland Greenway Commission authorized a study of the 20-mile Northern Central Rail Trail near Baltimore. Researchers found that whereas the trail cost $191,893 to maintain and operate in 1993, that same year it returned $304,000 in state and local taxes.[9]

The attractiveness of greenways to corporate America can be evidenced in the way research parks are designed. Creating campus-like office settings with generous open spaces, pathways, and scenic vistas has proven successful in numerous research and technology parks. Studies have shown employees are more productive and employee satisfaction highest while working in beautiful settings. The same holds true for management retention. Economic benefits within commercial developments are also directly attributable to greenways when they are incorporated into the design of office parks.

- Greenways are viewed as amenities by many residential, commercial and office park developers who, in turn, are realizing higher rental values and profits.[10]

[9] Trust For Public Land, Economic Benefits of Parks and Open Spaces, 1999, p.26.
[10] Roanoke Valley Greenway Master Plan, p.14.

- Corporations routinely evaluate localities for the quality of life benefits that can be offered to their employees living within the community. Recreation, greenways and open spaces are ranked highest among those quality of life factors influencing small business relocations.[11] The Joint Economic Committee of the U.S. Congress reported quality of life factors were more important than purely business-related factors, especially in high-tech and service industries (Scenic America, 1987).
- A survey of 71 economists rated Arizona's attractiveness as a place to live, work, vacation, and retire, also included business relocation. The strongest factors influencing these decisions were climate, job opportunities, and open space, of which "outdoor lifestyle and recreation opportunities" contributed significantly to business expansion and relocation (Valley National Bank, 1980).
- In some instances, office sites located adjacent to rivers, greenways, trails, created wetlands, and protected open spaces factored more heavily in attracting tenants and businesses than similar sites lacking those amenities. This is evidenced along the San Antonio Riverwalk, oceanfront boardwalks, and riverfront developments.
- "According to the National Urban and Community Forestry Advisory Council, consumers are willing to pay 12% higher for products in business districts with trees." [12]

5.1.b Serving Existing Tourism Markets and Emerging Ecotourism Prospects

Tourism plays a vital role in the economy of James City County. Our location within the Greater Williamsburg area, known as the Historic Triangle of Jamestown Island, Yorktown Battlefield, and Colonial Williamsburg, is recognized internationally as a major tourist attraction. Greenways can work to greatly enhance tourism opportunities. The reliance upon tourism to the local economy suggests that we examine how many of our development proposals may positively or negatively impact tourism. Greenways and trails can help stimulate new tourism opportunities within existing tourism networks.

- Tourism is currently ranked as the number one economic force in the world. In several states, regional areas, and localities throughout the nation, greenways have been specifically created to capture the tourism potential of a regional landscape or cultural destination. The state of Missouri, for example, spent $6 million to create the 200-mile KATY Trail, which, in its first full year of operation, generated travel and tourism expenditures of more than $6 million. Orange County, Florida, spent $2 million to create the 16-mile West Orange Greenway and expects to realize a complete return on its investment in the first year of operation through the economic revitalization of the small rural towns that lie along the trail's route. [13]
- Tourism is ranked as the third largest employer and the third largest retail industry in Virginia (behind groceries/food stores and autos/automobile dealers).[14]
- Travel and tourism continues to have a major impact on the U.S. economy, according to the Travel Industry Association of America. Preliminary data for the year 2000 estimate a six percent inflation of travel prices throughout the U.S. over 1999. Total U.S. spending on

[11] Trust For Public Land, Report citing Crompton, Love and Moore, "An Empirical Study of the Role of Recreation, Parks and Open Space in Companies" (Re) Location Decisions", p.37-58, 1997.
[12] National Tree Trust information, 2002.
[13] Roanoke Valley Greenway Master Plan, p.14.
[14] Virginia Department of Tourism, 2000 Virginia Travel data

travel in the U.S. in 2000 is predicted by TIA to be $561.3 billion, up 7.3 percent from the 1999 total of $523.0 billion.[15]

- In Virginia in 1999, travel and tourism expenditures totaled $12.36 billion and the industry directly employed more than 200,000 Virginians with a payroll of $37 billion. State taxes attributed to tourism in Virginia totaled $603 million, while local tourism-related taxes amounted to $389 million.[16] Local travel taxes attributed to James City County in 1999 was $8,177,000 and the City of Williamsburg was $11,139,000.[17]
- In 1998, a survey of 3,342 households found that regardless of the destination of their vacation, respondents had a 48.1% chance of participating in nature-based activities. Some of these respondents focused a majority of their time on nature-based activities with "14.5% as heavy users, 15.8% were moderate users, and 17.8% were spontaneous users." (The International Ecotourism Society fact sheet.)[18]
- One in 17 Virginians is directly employed in the travel industry.[19]
- In 1989, each dollar spent by the Department of Conservation generated $25 in the Illinois economy."[20]
- Outdoor recreation nationally generated $40 billion in 1996, accounting for 768,000 jobs and $13 billion in annual wages.[21]
- Across the nation, parks, protected rivers, scenic lands, wildlife habitat, and recreational open space help support a $502 billion tourism industry. Travel and tourism is the nation's third largest retail sales industry and one of the nation's top employers. At present rates of growth, the tourism/leisure industry will soon become the leading US industry of any kind.[22]

Greenways are often major tourism attractions in themselves.

- VDOT representatives have seen dramatic increases in tourism requests for places to hike and ride bikes.
- Internet websites now link browsers to thousands of bikeways and trails nationwide within states and geographic regions. Some of these sites include the American Hiking Society, Virginia Trails Association, the East Coast Greenway, hiking magazines, etc.
- There are many trail handbooks on the market with updated information on trail classification, location, amenities, scenic attributes, and other trail information. Some of these are done by state and region.
- The San Antonio Riverwalk is considered the anchor of the tourism industry in San Antonio, Texas. Tourism is the second largest economic sector in the city, accounting for $1.2 billion annually. The Riverwalk is the second most important tourist attraction in the State of Texas.
- In 1988, users of the Elroy-Sparta Trail in Wisconsin averaged $25.14 per day for trip related expenses. Total 1988 trail user expenditures were $1.2 million (Richard Hurd, San Antonio

[15] Virginia Department of Tourism, Travel Trends, Spring 2001
[16] Ibid.
[17] Virginia Department of Tourism, Economic Impacts of Travel in Virginia Cities and Counties, 1988-2000.
[18] Nationwide mainland survey by Bruskin Goldring for Visit Florida, Aug. 1998.
[19] Virginia Department of Tourism, 2000 Virginia Travel data
[20] NRPS, Benefits are Endless Campaign, p.35.
[21] Outdoor Recreation Coalition of America, "Economic Benefits of Outdoor Recreation," State of the Industry Report, 1997.
[22] The Economic Benefits of parks and Open Space, The Trust For Public Land, 1999, p.23.

Department of Parks and Recreation). Approximately 50 % of the users were from out-of-state, and the typical user traveled 228 miles to get to the trail.[23]

- Seattle, Washington is recognized nationally as the most bicycle friendly city, and Savannah, Georgia as the most pedestrian oriented city, in America. These communities become destination places by virtue of these amenities alone. More than 600,000 Americans took a bicycle vacation in 1985.
- The Crossroads Study for Williamsburg included a deterministic goal and vision to become the "most pedestrian friendly community in America" (Crossroads Study, 1998).
- The economic impact to our local economy when tourists stay an additional night is difficult to estimate. However, with over 2 million visitors to the Williamsburg area, and overnight spending at $50.00 per person,[24] this could generate $100 million annually.

Economic Effects of Greenway Expenditures[25]

**Direct Effects**
*Purchases by greenway users*
+
**Indirect Effects**
*Purchases of supplies and materials by the producers of greenway related products and services, and the purchases made by the producers of the supplies and materials*
+
**Induced Effects**
*Purchases of production supplies and materials by producers, resulting from purchases by households*
=
**Total Economic Effects of Greenway Expenditures**

5.1.c Special Events

Most cities and towns have annual special events that attract visitors. The variety of special events today include fireworks on national holidays, anniversary celebrations, reenactments of historical events, athletic competitions, unique natural events, and cultural displays, to name a few. Those activities gaining in attendance include opportunities for sightseeing and recreation. While some special events such as walk-a-thons, bike races, volksmarching, fund-raisers, and soccer camps create revenue sources during the event; these facilities remain in place as enhanced recreation amenities for the enjoyment of the resident community throughout the year.

- The 12th annual Great Race in Pittsburgh attracted 12,807 runners and 4,000 spectators to the city. The estimated direct economic impact within Allegheny County was $220,000 ... and exceeded $330,000 when registration fees were added.[26]
- Concessionaires

[23] National Park Service, Rail and Trails Conservancy (RTC), Resource Book, p.5-5.
[24] Virginia Department of Tourism
[25] NPS, Rail and Trails Conservancy, Resource Book, p.5-8.
[26] Ibid, p.3-4.

Special events can also be used to raise money for the greenway itself.

- The "Take A Walk on the Wide Side Ice Age Trail Hike-A-Thon," in Wisconsin attracted 1,200 hikers and raised $30,000 against $15,000 in expenses.
- The San Joaquin River Parkway and Conservation Trust in Fresno, California, organizes several annual events to raise money for the foundation and raise public awareness. The Greenway and Nature Center in Pueblo, Colorado, includes opportunities for local artisans and food establishments along the trail during events.[27]

5.1.d Reducing Infrastructure Expenses

Residents and policy makers routinely discuss the costs of public services provided by jurisdictions and how they should be funded. Some levels of service (LOS) are provided as a direct cost reimbursed by the user, while some are indirect costs provided through a general fund. In recent years, localities have demonstrated that residential expansion has created increases in public services, and in many cases, these services create revenue deficits that cannot be recovered through real estate tax assessments. A list of these development costs could include:

Transportation and Utility Costs
- Roads
- Public and private utilities,
- Sanitary sewage
- Water, natural gas, electricity
- Stormwater management

Facility and Service Costs
- Open space, recreation, libraries
- Schools
- Health care and human services
- Public transportation
- Police, Fire, and EMS (Emergency Medical Services)
- Mail delivery
- Solid waste collection, disposal and recycling

In virtually every example listed above, though not in every circumstance, greenways assist communities in their ability to enhance transportation, as well as facility and public service amenities. Many of these benefits appear in the form of direct economic gains, while other benefits appear as reductions or alternatives to existing costs. These benefits will be detailed in the following sections. Community-wide greenway development over a period of time can be expected to improve the quality of life in our community thereby continuing the current trend of attracting new residents to the area. As our community continues to become more attractive, the associated pressures to accommodate an increasing population will bring challenges to our existing regional water and public services infrastructure.

[27] Ibid, p.3-6.

Detention facilities are another infrastructure expense born by every locality. Crime prevention and alternatives to incarceration, such as recreation facilities and programs, should be explored.

- The Phoenix (Ariz.) Parks, Recreation and Library Department, when expanding its late night/weekend activities over the summer, found that such programs result in a 52% reduction in juvenile crime. Such programs were provided at a cost of 74 cents per person whereas the cost to incarcerate one teen for a year is $38,000. (Phoenix, 1994)
- It costs 100 times less to recreate than incarcerate.[28]
- For each $1 we spend on rehabilitation, we save $11 later. (The Phoenix Project, Section II, page 18, 1995)

## 5.2 Recreational Benefits of Greenways

The recreational enjoyment by citizens remains one of the single greatest factors in promoting greenways and trails. Walking continues to be the number one recreational activity in America.[29] Fully 65% of Americans walk for recreation, health or leisure, 31% bicycle, 24% visit natural areas, 20% jog, and 15% hike/backpack.[30] Greenways are easily designed to accommodate all these recreation types, and more. If greenway development can be provided within close proximity of neighborhoods, residents would be more likely to spend a few minutes getting to a trail and hiking for 30 minutes than the time it takes getting to most other recreational activities by car. Studies also show that if more trail facilities were accessible to citizens, they would use these facilities to bike or walk short distances over driving their car.

- A nationwide trail vision recommends a system of trails be provided that are within fifteen minutes of every household.[31]
- The 1987 Presidents Commission on Americans Outdoors recommended a national system of greenways in response to meeting the basic recreational need of citizens to get outdoors and to also protect our natural heritage.
- In 1982, people spent more on recreation and leisure than the U.S. Government spent on national defense or housing construction (National Park Service, 1983).

[28] NRPA, The Benefits Are Endless campaign, fact sheet, 2000.
[29] National Parks and Recreation Society.
[30] Virginia Outdoors Plan, p.90, 1996.
[31] Trails For The Twenty-First Century, Karen-Lee Ryan, The Rail-to-Trails Conservancy, 1993, p.forward.

RANKING OF ACTIVITIES BASED ON PERCENTAGE OF HOUSEHOLDS PARTICIPATING[32]

| Rank | Activity | Statewide % |
|---|---|---|
| 1. | Walking for Pleasure | 65% |
| 2. | Driving for Pleasure | 60% |
| 3. | Swimming | 53% |
| 4. | Sunbathing on Beach | 42% |
| 5. | Visiting Historical Sites | 35% |
| 6. | Picnicking | 34% |
| 7. | Boating | 31% |
| 8. | Bicycling | 31% |
| 9. | Fresh Water Fishing | 29% |
| 10. | Camping | 26% |
| 11. | Visiting Natural Areas | 24% |
| 12. | Playground | 24% |
| 13. | Salt Water Fishing | 21% |
| 14. | Tennis | 21% |
| 15. | Golfing | 20% |
| 16. | Visiting Gardens | 20% |
| 17. | Jogging | 20% |
| 18. | Hunting | 17% |
| 19. | Hiking/Backpacking | 15% |
| 20. | Snow Skiing | 13% |
| 21. | Softball | 12% |
| 22. | Basketball | 12% |
| 23. | Nature Study | 9% |
| 24. | Volleyball | 9% |
| 25. | Water Skiing | 8% |
| 26. | Baseball | 7% |
| 27. | Soccer | 6% |
| 28. | Horseback Riding | 6% |
| 29. | 4WD-Off Road | 6% |
| 30. | Fitness Trail | 6% |
| 31. | Football | 5% |
| 32. | Tubing | 4% |
| 33. | Skateboarding | 3% |
| 34. | Jet Skiing | 3% |
| 35. | Motorcycling-Off Road | 3% |
| 36. | Rafting | 3% |
| 37. | Unlicensed Off Road | 2% |
| 38. | Sail Boarding | 1% |

Virginia Outdoors Survey Ranking of Activities[33]

| Rank | Activity | Statewide % |
|---|---|---|
| 1. | Walking for pleasure | 67.1 |
| 2. | Driving for pleasure | 62.4 |
| 3. | Swimming | 52.2 |
| 4. | Fishing | 42.0 |
| 5. | Visiting historic sites | 40.4 |
| 6. | Bicycling | 39.7 |
| 7. | Sunbathing | 39.1 |
| 8. | Boating | 34.1 |
| 9. | Picnicking | 28.7 |
| 10. | Camping | 28.2 |
| 11. | Visiting natural areas | 26.9 |
| 12. | Golfing | 25.1 |
| 13. | Using playgrounds | 24.4 |
| 14. | Visiting gardens | 21.6 |
| 15. | Jogging/running | 21.5 |
| 16. | Hiking/backpacking | 18.3 |
| 17. | Tennis | 16.2 |
| 18. | Playing basketball | 15.4 |
| 19. | Hunting | 13.8 |
| 20. | Shooting | 13.4 |
| 21. | Snow-ski/snowboard | 11.9 |
| 22. | In line skating | 11.2 |
| 23. | Nature study/program | 11.1 |
| 24. | Playing softball | 10.1 |
| 25. | Playing soccer | 8.7 |
| 26. | 4-wheel drive off road | 7.6 |
| 27. | Using fitness trails | 7.3 |
| 28. | Playing football | 7.0 |
| 29. | Water skiing/towing | 6.7 |
| 30. | Jet ski/personal watercraft | 6.5 |
| 31. | Playing baseball | 6.2 |
| 32. | Horseback riding | 6.2 |
| 33. | Playing volleyball | 6.1 |
| 34. | Tubing | 6.1 |
| 35. | Skateboarding | 4.1 |
| 36. | Rafting | 3.7 |
| 37. | Driving all-terrain vehicle | 2.4 |
| 38 | Motorcycling off road | 1.2 |
| 39. | Other activities | 2.8 |

[32] Virginia Outdoors Plan, 1996, p.326.
[33] Virginia Outdoors Plan, 2002, p.390.

Recreational driving is rapidly becoming an emerging activity as Americans become more sedentary. In 1998, 75% of all travel was for pleasure, of which, outdoor recreation and entertainment accounted for 41%.[34] A major component of this greenway master plan includes preserving greenbelt buffers along roadways for conservation, tourism, and recreational purposes. The Blue Ridge Parkway was the number two tourist destination in Virginia in 1996, and the Colonial Parkway was ranked number nine. It is estimated the scenic quality of Williamsburg contributes substantially to our tourist economy, and protecting the proprietary interests of this historic community remains the principle open space goal within our locality. Providing well-landscaped roadway corridors and generous greenbelt buffers within Community Character Corridors enhances our ability to attract visitors and ensure their return.

The capital investment return on commercial greenways (in commerce and business parks) is typically realized within a couple of years. Recreational trails, however, may never fully recapture their return even when increased property values are factored in. This does not mean they shouldn't be built, for most athletic facilities are an integral, albeit expensive, part of the recreational services provided by a locality. Yet when other benefits such as transportation, education, environmental protection, quality of life, and health and wellness are included, these factors tip the balance in favor of greenways. City Managers and Land Trust managers across the country are convinced that it has become too costly not to protect open spaces. [35]

"It is no coincidence that increased demand for outdoor recreation has been simultaneous with the growing popularity of greenways, since greenways are well suited to active travel-oriented sports."[36] Greenways that connect places provide the type of recreation that walkers, joggers, and bikers like. When greenways are located within naturally appealing and scenic locations, greenways creates strong alliances between the environmental and recreational community. The effectiveness of this alliance provides policy-makers with strong community support to make positive commitments for greenway development.

- However, the amount of leisure time for the average person has declined in recent years, as much as four hours per week compared to the 1960's. We are working longer hours, engaging in less physical activity, and spending more time indoors. In 1987, the President's Commission on Americans Outdoors cited limited access to outdoor resources as a growing problem throughout the nation. The Commission recommended to President Reagan that a system of greenways could provide all Americans close proximity to linear open space resources close to where they live and work.[37] The thrust of greenways and trails is to connect people to recreational open spaces that are close and accessible to where they live and work.
- Outdoor recreation nationally generated $40 billion in 1996, accounting for 768,000 jobs and $13 billion in annual wages.[38]

[34] NPS, RTC Resource Book, p.5-4.
[35] Trust For Public Land, Economic Benefits of Parks and Open Spaces, 1999, p.8.
[36] Ecology of Greenways, Smith and Helmond, 1993, p.15.
[37] Roanoke Valley Greenway Master Plan, p.14.
[38] Outdoor Recreation Coalition of America, "Economic Benefits of Outdoor Recreation," State of the Industry Report, 1997.

5.2.a Increases in Health and Wellness

The health and wellness of recreational walking has gained national attention as Americans struggle to maintain and improve their health. Older Americans are asked by their doctors to walk at least two miles a day to maintain healthy lifestyles.[39] Today, we have mall walkers in shopping malls, and walkers in civic open spaces like the Restored Area, where older Americans walk for health and fitness (not to mention enjoyment of the safe and beautiful setting). The implementation of fitness trails during the past 20 years has increased while usage of these facilities has declined, in part, due to changes in how we perceive recreation and fitness. Walking and hiking provide the benefits of recreation without the rigor of fitness.

- The City of San Jose, California, showed that those who exercised regularly had 14% fewer medical claims, 30% fewer hospital days, and 41% fewer claims greater than $5,000 (City of San Jose, 1988).
- A 1984 study of office staff of Houston's Prudential Insurance Company found that higher levels of employee fitness lowered major medical and disability costs (Wellness Councils of America, 1989).
- Each additional mile walked or run by a sedentary person would give them an additional 21 minutes of life... and would save U.S. society an average 34 cents in medical and other costs. (RAND Corporation, 1993) If each American walked one hour a day, we could reduce health care costs by $20 billion annually. It also costs 100 times less to recreate than incarcerate.[40]
- Psychologists found that pleasant events such as a walk in the woods or dinner with friends gave a boost to the immune system that lasted two or three days. (Sachs and Segal, 1995)
- Physically active older adults have lower blood pressure than their less active counterparts (Pescatello et al., 1990) and active middle-aged and older populations have lower cholesterol levels than do their less active counterparts. (Reaven et al., 1990)

5.2.b *Recreation,* Tourism and Ecotourism

James City County is a popular ***Heritage Tourism*** destination, commanding a premier place in American history with Jamestown (NPS) as the first permanent English settlement in the New World. Commonly referred to as the Historic Triangle of Jamestown, Yorktown and Colonial Williamsburg, our community reaps tremendous economic benefits from existing tourism markets. "Visiting historical sites is the fifth-most popular vacation activity."[41] Recent trends in tourism note additional revenues are possible if localities could entice tourists to stay overnight, thus adding another day to the itinerary. This amounts to millions in accommodations and services. Opportunities for the arts, leisure, passive recreation, and active sports such as bicycling and golf might interest visitors to extend their stay. ***Ecotourism*** is a new, emerging trend in vacation planning to be given serious consideration for our community. It blends environmental stewardship, profitable tourism enterprises, and nature-based recreation into one of the fastest growing tourism trends. "Because ecotourism is expected to be more popular in the future, it is essential that important lands within Hampton Roads be identified and conservation

[39] Roanoke Valley Greenway Master Plan Ibid, p.15.
[40] NRPA, The Benefits Are Endless campaign, fact sheet, 2000.
[41] Virginia Outdoors Plan, 1996, p.51.

mechanisms be established to ensure the longevity of this biodiversity."[42] The Williamsburg community finds itself already positioned to capitalize on this new market by making use of existing tourism infrastructures, natural beauty and breathtaking scenery. (For additional information on ecotourism, refer to Economic Benefits, Section 5.1.b)

In order to capture these interests, facilities must be provided. Facility recommendations should respond to recreational demand, detailed as user percentages. Greenways are natural conduits to attract new visitors. "Visiting natural areas, preserves, and refuges was an activity enjoyed by 24% of those surveyed, and visiting gardens was the 16th most popular activity."[43] When nature-based tourism and recreational hiking are combined, the result should be marketed as ecotourism on greenways. York River State Park, with over 2,500-acres of protected natural areas in James City County, has emerged as another local attraction offering numerous recreational trails and environmental education programs. "The total economic value to overnight visitation at Virginia state parks is an estimated $21.5-31.7 million (annually)."[44]

Creating ecotourism opportunities in Virginia is gaining more attention. "Economic development and tourism officials in rural Virginia are increasingly aware of the economic potential associated with promoting outdoor recreational opportunities."[45] Greenways, by design, are uniquely poised to capture the synergy of recreation, tourism, and nature-based sightseeing. Connecting natural and cultural features by greenways will serve local residents and tourists alike. An example of this is the Williamsburg Historic Necklace, which was selected as a White House Millennium Trail in 1999. This conceptual 31-mile continuous corridor, currently accessible by car along the Colonial Parkway, Greensprings Road and Centerville Road, links 13 major historical and natural sites. Plans are underway to provide a multiuse trail along the Parkway between Yorktown and Jamestown that would allow off-road hiking and biking transportation. The James River Greenway, proposed in the Virginia Outdoors Plan, is another opportunity for greenway-stimulated ecotourism in our community. Getting these systems built in time for Jamestown 2007 could produce long-term vacation interest that lasts for years.

### 5.2.c Easements That Permit Trail Development

When subdivisions and other development activity come before the County Planning Department for Site Plan Review, it would be beneficial to consider acquisition of greenway corridors or natural open space easements at that time. Much of our County's current easement language permits the construction of trails, but this does not mean that it has jurisdictional approval or citizen support to build them. Unless the approved master plan or deed reflects that a trail has been approved, it may not be embraced once the site is developed. Since some greenway opportunities are reflected as conceptual routes in the Greenway Master Plan, practical routes must be devised over extended periods of time. The success of this strategy can only be accomplished by having Parks and Recreation included as one of the routing agencies required for full review.

[42] Virginia Outdoors Plan, 1996, p.295.
[43] Virginia Outdoors Plan, 1996, p.51.
[44] Virginia Outdoors Plan, 1996, p.54.
[45] Virginia Outdoors Plan, 1996, p.53.

## 5.3 Transportation Benefits of Greenways

For most communities, the only transportation opportunities that allow us to get from points of origin to destination are via roadways. Dependence upon automobiles and public roadways as the only transportation option has created obstacles for residents for even short-distance errands. When businesses and community services are located within proximity of offices and residential areas, studies show an increased use of bikeways and pedestrian usage of sidewalks was preferred over roadways.

- An analysis of 1980 census data by the Northern Illinois Planning Commission showed 7,000 commuters in the Chicago region used a bicycle to get back and forth to work, weather permitting. Most of the bicycle commuters lived and worked along one of the five linear trails found in the region, accounting for an average of 15.6 percent of commuter trips. These trails offer an alternative to using congested roadways to get to work.[46]
- National surveys by the Federal Highway Administration have shown that Americans are willing to walk as far as 2-miles to a destination, and bike as far as 5-miles. It is easily conceivable that destinations can be linked to multiple origins with a combination of off-road trails and on-road bicycle and pedestrian facilities.[47]

In most communities, the ideal design of interconnected greenways and trails would make it possible for citizens to travel inside linear open spaces to reach major destinations without user contact with automobiles. To determine if this is an achievable goal in James City County requires discovery of what obstacles may hinder this goal. While nothing is impossible, it may not prove feasible. This is most evident in retrofit corridors, where the majority of planned areas have already been developed. An example of this is Ford's Colony. The Powhatan Creek Greenway conceptual corridor cannot be achieved without going through this gated community; hence other alternative routes are needed. Some trail development must wait until such time when land use patterns or citizen attitudes change to allow for the acquisition of public greenways in the future.

The 1997 Comprehensive Plan detailed numerous recommendations to develop a transportation system that facilitates a variety of transportation modes in order to reduce congestion, pollution, energy consumption, including provisions for sidewalks, and bikeways. These recommendations are listed in Appendix 13.3.

In areas where new development allows regulatory means to prevail, the realization of the master plan can be successfully implemented on a site-by-site basis. This component approach requires the patient examination and implementation of an approved Greenway Master Plan over time to capitalize on corridor opportunities as they arise, and implies that the Board of Supervisors has created the enabling tools (i.e. zoning ordinances) to make it possible. This action will remove the appearance of building trails that lead to nowhere.

Greenway corridors can also be integrated as part of the roadway network. Serving as extensions of the roadway corridor, these off-road separated paved facilities require coordination with state road development projects. These types of facilities enable users to travel in highly visible and

[46] Ibid, p.6-6.
[47] Roanoke Valley Greenway Master Plan, p.13.

familiar corridors between popular destinations such as work, school, shopping, parks, libraries, and significant sites of cultural and natural interest. An example of this is the multiuse trail at the James City/Williamsburg Community Center on Longhill Road and the Longhill Connector Road. Citizens no longer have to travel by car to get from their neighborhood to the park. While this type of corridor works as a transportation corridor, it lacks the amenities of a rural trail woven between mature shade trees. Providing separated multiuse trails is a preferred recommendation along existing roads because they accommodate the greatest number and broadest range of trail users is a growing trend in the state. Similar types of facilities were planned and developed for the Fairfax County and Prince William Parkways, among others.

When separated facilities are not possible, shared roadway facilities are recommended. Experienced bicyclists are more at ease on 5-foot wide shoulder bike lanes parallel to the travel lane than with pedestrians on multiuse trails, who typically avoid these facilities except in extreme circumstances. Families tend to shy away from putting children on shoulder bike lanes since they are dangerously close to fast moving traffic. While these corridors can easily be retrofitted onto most existing roads, the majority of the public finds their usage unsafe. Only about one percent of the population uses these bikeway facilities for transportation, making a stronger case for multiuse trails within the roadway corridor.

Transportation studies have begun incorporating bike lane and multiuse trails into the congestion mitigation equation. Meanwhile, other forms of transportation, such as railroads, have been abandoned over the years in favor of automobiles. Promoted as a regional alternative, future light rail and rail trail projects could signal a resurgence in alternative means of transportation for the Peninsula. These two transportation systems have coexisted in the past and recent studies reveal the rail/pedestrian/multiuse trail corridors are gaining wide acceptance, as a multi-objective approach to meeting our current and future transportation needs. As Fast Rail plans proceed locally, a shared corridor with trails should be part of the design plan.

Mass transit bus systems seem to have the best results in small communities that are unable to build commuter rail and metrorail systems. Buses should be equipped with bike racks to enable greater flexibility in promoting the integration of multi-modal alternative transportation means. Intermodal transfer stations could help alleviate many of the drawbacks of intermodal transportation by providing storage lockers, secure bicycle storage racks, and weather protective shelters in order to make intermodal transportation choices more appealing. Regardless of the means determined as most suitable for our community, it should offer many of the same benefits and appeal provided by automobiles, such as safety, comfort, efficiency, reliability, flexibility, and affordability.

Many communities see linking multiple destinations along a continuous greenway network of pedestrian trails and bikeways as a desirable and attainable transportation goal. Funding for many of these new and emerging transportation systems are available through Federal Highway Administration grants like TEA-21 (formerly ISTEA) and CMAQ (Refer to Appendix 13.6). Providing pedestrian based transportation networks is reminiscent of our nation’s earliest means of transportation.

5.3.a Improve air quality

Most environmental benefits, including reducing air pollution, can be quantified and represented to encourage the acquisition of greenways for greenbelt development. The ability for trees to remove pollutants such as carbon dioxide, carbon monoxide, and other toxic chemicals is invaluable to urbanized areas confronted with smog. "The City of Dayton, Ohio, for example, encourages natural vegetation to grow along major highways that circle the city. These vegetation corridors absorb pollutants and reduce wind velocities that have been an annoyance downtown." [48] Tree-lined roadways provide fresh-airways into urbanized areas, improve the visual character of the roadway experience, and provide sun protection to early morning and evening commuters when the sun angle is low on the horizon and blinds drivers.

5.3.b Gateways and Corridor Enhancements

Providing gateways (major roadway/transportation entrance portals) and corridor enhancements along all our roadways and entrance corridors are excellent examples of how vehicular greenways (Section 8.2) improve the visual character and quality of our community. While they may be the most instrumental and beneficial application of greenway principles within most communities, especially Williamsburg, funding mechanisms are often non-existent. As tourism markets endeavor to attract more visitors, the quality of their arrival experience alone may influence how long they stay, how much they spend, and when- or if- they will return. Providing well-landscaped corridors of mature vegetated buffers, seasoned with wildflower meadows, perennial flowerbeds, and median plantings, cumulatively add to the total 'first impression' arrival experience.

When new roads are proposed, generous buffers should be part of the design program. Other components in the enhancement equation include billboard restrictions, reductions in sign pollution, consistent signage, bright light and neon sign restrictions from adjacent lands, softer engineered slopes and ditches, and naturalized stormwater ponds (called BMP's). In most cases, the enhanced corridor can accommodate parallel trail facilities, which become visible amenities that may extend the duration of a typical tourist visit. Vegetated greenbelts themselves are worthy of increased funding, if nothing more than to enhance the recreational driving experiences of our citizens as they go about their numerous daily trips. For some, these corridors may be the only natural environments they may experience.

## 5.4 **Environmental Benefits**

Protecting the environmental assets of our community remains the preeminent driving force behind all major greenway planning decisions. The intrinsic environmental value associated with preserving rivers, streams, wetlands, and natural open spaces outweigh the beneficial value of all other uses combined. Quantifying these assets is easier said than done. In recent years, the scientific community has adopted a means of defining these diverse environmental variables and attaching economic values to them. Known as ecosystem services, they qualify those essential environmental systems necessary for our existence, and translate them into tangible costs. If we destroy any of these natural systems, we are obligated to restore or replace them. This became obvious during the 1960's and 1970's with the Clean Air and Water Act. We could no longer compromise our natural environment without also compromising the health and well being of

[48] Greenways, Charles Flink and Robert Searns, sponsored by the Conservation Fund, 1993, p.130.

our community and its citizens. As Winston Churchill once said, "We shape our environment, then our environment shapes us."

One tangible example is wetlands. If they are destroyed, policies and ordinances require us to replace them. Wetlands are complex water filters providing aquifer recharge, silt pollution reductions, storage of floodwaters, and critical species habitat. Greenways and conservation easements often result in reduced infrastructure expenses that prevent natural hazards from occurring. Protected wetlands providing flood protection alone can save millions of dollars in real property resulting from flood damage. Ecosystem services can also offset replacement or restoration costs if engineered solutions were provided instead of a nature-based solutions. More than being just a complex water filter, wetlands are also home to some of the most diverse plant and animal habitats on the planet.

"The ecological benefit of greenways is an enormous factor considering the magnitude of its' collective impact on community planning. Entire books have been written on the subject, with benefits outweighing costs by a large margin. The over-arching aim in greenway ecology promotes the integration of scientific information by finding ways to apply it to the art of design." [49]

### 5.4.a Conservation of Natural Resources

"Greenways help minimize the impacts upon nature by protecting four key landscape components: soils, plants, animals, and water." [50] Other natural resources include air and open space. In order to comprehend the significance and importance of conserving our natural resources, we need to understand how these natural elements comprise a network of natural systems, each intricately woven and dependent upon the other. One small change that may appear seemingly insignificant could alter the delicate food web balance or habitat of another plant or animal. The natural environment functions more like an organism than a system, and as such, this delicate ecosystem balance must be maintained for the good of the whole.

#### Soils

Soils are a natural resource that can be protected through greenway and open space planning. Soil conservation has been an integral part of the JCC planning process since the 1950's. Franklin Delano Roosevelt, in support of the Soil Conservation Service, said, "The nation that destroys its soil destroys itself." Aldo Leopold said, "Life is nothing without the land." James City County has benefited from a proud agricultural heritage for nearly 400 years. Those remaining farmlands still in agricultural production are easily identified as the most prime agricultural soils, as evidenced when marginal soils are allowed to go fallow and regenerate into forest. Preserving prime agricultural soils, rather than permitting intensive development, reduces demand upon infrastructure and public services such as water, sewer, roads, and school facilities. Landscape variables such as steep slopes, highly erodible soils, and shrink/swell soils make a strong argument for land conservation that restricts development in hazard prone areas. The Purchase of Development Rights program gained approval by the Board in November 2001 with

[49] Ecology of Greenways, Smith and Helmond, 1993, p.17.
[50] Ecology of Greenways, Smith and Helmond, 1993, p.106.

objectives and strategies for protecting prime agricultural soils and other agricultural resources that provide long-lasting benefits for the County.

- In Culpepper County, Virginia, the average new residential unit can be expected to produce a deficit in the County budget of $1,242 annually (1988). For every dollar of tax revenue collected from residential uses in 1987, $1.25 was spent on county services. For every dollar collected from industrial/commercial or farm/forest/open space lands, only $0.19 was spent on services.[51]
- Recent studies in Loudoun County, Virginia, estimate for every dollar collected from tax revenues, $1.55 is spent on services, such that $600 million is needed to fund 23 new schools in the next five years (Virginia Gazette, O'Donovan, July 11, 2001, p.11a).
- Similar figures are available in James City County, with the actual figure closer to $1.41 spent on services. According to recent estimates, infrastructure service deficits expected as a direct result of new home construction equates to approximately $12,442 per home. The widespread but erroneous assumption that new homes create a broader tax revenue base is no longer an accepted premise upon which to build local fiscal health.
- The acquisition of Mainland Farm (1616) by James City County, considered the oldest continuously cultivated farm in America, prevented the master plan development of 430 new homes. Purchasing this historic farm and prime agricultural soils resulted in savings of $230,000 annually from infrastructure deficits, essentially paying for the $2.2 million farm within eight years.[52]
- "A study of the impacts on neighborhood property values in Boulder, Colorado, revealed the aggregate property value for one neighborhood was approximately $5.4 million greater than if there has been no greenbelt. This results in approximately $500,000 additional potential property tax revenue annually. The purchase price of the greenbelt was approximately $1.5 million, recouping the cost from property tax alone in only three years. In the study, the authors noted the potential increase is overstated in part because actual assessments may not fully capture greenbelt benefits."[53]
- A survey of residential neighborhoods by the Rocky Mountain Research Institute shows the public's increasing interest in greenways and trails. From 1980 to 1990, those who said they would pay extra for greenbelts and parks in their neighborhood rose from 16% to 48%." [54]
- "Natural open space and trails are prime attractions for potential home buyers in 1995. According to research conducted by American Lives, Inc. for the real estate industry, 77.7% of all homebuyers and shoppers in the study rated natural open space as either "essential" or "very important" in planned communities. Walking and bicycle paths ranked third." [55]

Plants

Open space fragmentation resulting from poorly planned development may alter plant and animal habitats with detrimental consequences. "This area of the state has a wealth of biodiversity and is home to one-third of the rare, threatened and endangered plants in the

[51] National Park Service, Economic Impacts of Protecting Rivers, Trails and Greenway Corridors, 1992, p.7-4.
[52] James City County Open Space Land Acquisition Plan, 1999.
[53] National Park Service, Economic Impacts of Protecting Rivers, Trails and Greenway Corridors, 1996, p.1-8.
[54] Ibid, p.1-8.
[55] Ibid, p.1-3.

Commonwealth." [56] The Least Trillium and Small Whorled Pogonia, both endangered species, survive locally only in certain habitats. Alterations in water supply, available sunlight, nutrients, and forest canopy, due in part to clear-cutting of trees, have adverse effects on these rare and beautiful native wildflowers. Many of our other native wildflowers are at risk as well. Two native plant refuge sites have been designated in the County (at the James River Elementary School Nature Trail and the Greensprings Trail behind Jamestown High School) to reintroduce some of these plants rescued prior to development. Protecting our natural heritage is a chief aim of the Greenway Master Plan.

Animals

Greenway corridors also provide excellent migration routes for many birds and animals. Migratory bird corridors in our region are typically oriented north/south. While local rivers and streams run east/west, opportunities to provide north/south greenway corridors are very desirable. Preserving critical open spaces in the form of greenways for animal habitat is essential to maintaining healthy wildlife populations.

Most of the wildlife in our urban communities are known as "edge species." These mammals, birds, amphibians, and insects have adapted to urbanizing landscapes and are developing a harmonious relationship with urban residents."[57] Since many of our buffers represent a patchwork of edges, connecting these edges and hedgerows into seamless greenway corridors would provide excellent habitat for many animal species. As valuable as these edges are, it must be further recognized that there are species that are adversely affected by "edges" and must therefore have large unfragmented spaces for habitat.

The width of a greenway plays an important role in how effectively these open spaces function. "Greenways, especially when very narrow, are greatly exposed to influences from outside their borders. Assessing these intrusions, whether by human activity, predation by pets, or disruption of natural communities by invasive species, is of prime importance.[58] In order for greenways to serve as migration corridors linking patches of open space, "Wildlife experts indicate that a 600-foot wide corridor is suitable (to handle this function). A 300-foot strip of forested area provides an adequate buffer to give passersby or a homeowner the sense that the property is preserved in its natural state."[59] This may relegate zoning buffers less than 50-feet to little more than ordinance compliance with little appreciable environmental or societal benefit. The context in which any greenway is located, coupled with its function, should govern the corridor width.

Water

Water quality improvements, resulting from strong environmental protection laws enacted over the years, have witnessed significant recovery in plant and animal populations and habitat. With silt being the number one pollutant to the Chesapeake Bay, efforts that prevent or minimize silt from entering rivers and streams are effectively managed through regulatory means. One means of providing these water quality improvements occurs in the area of enhanced riparian buffers.

[56] Virginia Outdoors Plan, 1996, p.294.
[57] Roanoke Valley Greenway Master Plan, p.17.
[58] Ecology of Greenways, Smith and Helmond, 1993, p.14.
[59] Virginia Outdoors Plan, p.90, 1996.

While it is outside the scope of this plan to recommend environmental policies, it may be discovered that the 100' Resource Protection Area (RPA) buffer is insufficient for providing essential environmental benefits in critical watersheds such as the Powhatan and Yarmouth Creeks. Reliance on data from environmental studies should be proposed under these circumstances. Enhancing biologic and ecosystem integrity with wider riparian buffers, while promoting water conservation programs to reduce water usage and waste, are invaluable tools to preserving this most valuable of all natural resources. More information is detailed under Stormwater Management.

Airways

Airways producing air quality benefits exhibit another ecosystem service provided by greenways designed to augment the impacts of urbanization and air pollution in cities. Trees within greenway buffers along roadways help filter pollution by absorbing automobile exhaust emissions. While we see no observable problems created by restricted airflow and circulation in our community, as urbanization increases, greenways may help provide and protect future corridors to channel air through increasingly congested areas.

## 5.4.b Open Space Preservation

The intrinsic value of open space as a natural resource identifies the nature of the space as predominantly open. Citizens know open space when they see it, but the descriptive terms used to define open spaces are quite varied among practitioners and jurisdictions. The nature and quality of these spaces are routinely defined by their context and the multifaceted benefits they offer to humans. However, open spaces also offer plants, animals, and natural processes the unimpeded ability to function as part of an ecological continuum. Open spaces are best characterized according to their function and context, with two basic distinctions known as cultural (human implied) open spaces and natural open spaces.

The Code of Virginia 10.1-1700 defines ***open space*** land as "any land in an urban area which is provided or preserved for (i) park or recreational purposes, (ii) conservation of land or other natural resources, (iii) historic or scenic purposes, (iv) assisting in the shaping and character, direction, and timing of community development, or (v) wetlands as defined in Code 28.2-1300." The premise of this definition implies an urban use of the resource, qualifying this as a cultural open space characterized by human values that are applied to the resource. There is potential for overlap between these definitions on the edge of urbanized areas, where transitional lands blend rural and urban attributes.

Providing open space land represents an investment of green infrastructure that smart growth advocates believe make cities and communities more livable. By preserving open space, we invariably increase the value of surrounding land "that reduces the pressure to bulldoze economically valuable farmland and natural areas on the urban fringe."[60] Greenways play an integral part in the planning and preservation of open spaces, as well as guiding land use and development decisions (Refer to Appendix 13.1 Open Space Planning Diagram). The County's Open Space Program, initiated in 1997, has spent over $3 million as of May 2001 protecting critical open spaces. The strategy for the plan is detailed below:

[60] The Economic Benefits of Parks and Open Space, The Trust For Public Land, 1999, p.6.

Objectives of the Open Space Land Acquisition Program

In April 1997, Staff presented a strategy to the Board of Supervisors, which recommended four primary objectives for open space land acquisition. They are:

- To preserve the national treasure of Williamsburg and James City County.
- To preserve the beauty and biodiversity of the natural environment for the benefit of those natural systems and for the benefit of our residents for future generations.
- To restrict growth and development from occurring in areas which compromise the fabric and character of our community.
- To preserve our agricultural heritage through farmland preservation.

Cultural and natural open spaces are categorized according to function and context. Buffers along roads and zoning borders may be considered cultural open spaces because their fragmented character reduces the land's ability to respond to natural processes in a natural way. While golf courses may be considered open spaces, their predetermination as a recreational resource precludes them from being designated as natural open space. In contrast, hiking trails that are woven through natural open spaces produce little appreciable impact upon the environment, allowing the open space to essentially remain natural in context. These guidelines should help us in the future to determine the character and quality of the open space to be protected, including its merit towards achieving the Chesapeake Bay Act open space requirement.

- During the 2001 elections, 22 states approved more than 75 measures that committed $3 billion to the preservation of open space and the enhancement of recreational opportunities.[61]
- Virginia, unlike most of her nearby states, does not have a permanent dedicated source of funding in the annual budget for open space preservation. North Carolina devoted $60 million, Maryland $80 million, and Virginia allocated $2.2 million in 2001.[62]

5.4.c Preservation of Historic Sites

James City County is internationally acclaimed for its rich American history, which has become our greatest asset and source of community identity. Since the founding of the first permanent English colony in 1607, generations of inhabitants have left their mark on the landscape. Citizens and policy makers understand we are obligated to, as part of a national trust, to preserve and protect this historic community for current and future generations. The task of protecting the cultural heritage and historic legacy of the James City/Williamsburg area is another primary goal of the Greenway Master Plan, seen as major component of the open space master plan.

The County and the Virginia Department of Historic Resources, as of 1995, have documented over 876 historic sites, representing only a fraction of the number of sites having been recorded [63], some of them protected in perpetuity. Opportunities are available during the Site Plan Review process to initiate archaeological studies to determine if any historic or prehistoric sites may be impacted by proposed development. In such cases where significant sites are discovered, the development plan is modified to prevent destruction of cultural resources and/or the area is protected by either a natural open space easement or conservation easement.

[61] Landscape Architecture News Digest, Argust, Marcia, "Today's Political Landscape", December 1, 2000.
[62] Williamsburg Land Conservancy Newsletter, Summer 2001, and information provided by DCR.
[63] Preserving Our Hidden Heritage, An Archaeological Assessment of James City County, 1997, p.2, Methods.

"Acting in the present to preserve our past for the future" was the Williamsburg Land Conservancy's theme. Opportunities to interpret these historic sites through trail guides, interpreters, brochures, and maps provide residents and visitors the chance to celebrate unique historical experiences on a personal scale. Greenways that link these cultural resources are, in themselves, a worthy goal of the Greenway Master Plan, but if these sites are also connected to natural resources, an exciting story can be told about the lifestyles, customs, and hardships of former generations... and the living landscape that evolved under their handiwork.

### 5.4.d Protection of Natural Systems and Ecosystem Services

The use of a natural systems approach to land use planning is a standard practice today used by most localities and regional planning districts. It maintains the integrity and diversity of those natural systems uncompromised by economic, political, or cultural influences. Unfortunately, this one-sided natural perspective of the land creates a point of disconnect between environmentalists and the development community who view protected open spaces as a waste of developable land, except when valued as a viewshed. Rarely do development proposals offer anything less than the maximum permitted development option. It is in the arena of economics and aesthetics that these two sides agree to disagree.

When natural systems are preserved, they provide tangible relief in the form of air, water, thermal, and noise pollution reductions. These reductions represent the basis behind ***ecosystem services***: it documents ways to reduce pollution using natural means that are financially more affordable, compared to similar services provided by engineered alternatives. Pollution mitigation is an added incentive for greenway and open space preservation, especially when regulatory agencies are able to withhold federal funding when regions or localities exceed hazardous pollution levels. There are limits to which a landscape can absorb pollution, but the following examples demonstrate the importance that greenways and vegetative buffers play in terms of pollution mitigation.

- An acre of trees produces enough oxygen to supply 17 people.
- Plants have an ability to absorb, deflect, and refract sound. A forestry study found that sound reductions attributed to wide greenbelts of tall, dense trees often reached 10 decibels, and soft surfaces such as grass or plowed ground adjacent to a tree belt reduced noise levels by 8 to 12 decibels (National Park Service, 1983).
- It has been determined that in a city environment every tree is worth $275 in benefits each year due to reductions in air-conditioning costs, erosion control, wildlife protection, and air pollution control. (Florida Department of Natural Resources)
- Greenways located along streams provide riparian vegetative buffer benefits that help filter out pollutants and provide shade to keep water temperatures cooler. A study of an agricultural watershed and riparian forest in Maryland found that if the riparian forest were removed, twice as much nitrate would have been lost to the stream (Peterjohn and Correll, 1984, as cited in Riser, 1987).
- New York City found that creating a watershed protection area to purchase vegetated open space uplands that protect valuable water recharge areas at a cost of $250 million would mitigate the need to build a $5 billion water filtration plant. (Healing America's Cities, 1994)

- The opportunity to provide trails that educate citizens about natural areas is one conservation technique to aid in preserving these environmental systems.

5.4.d.1 Stormwater Management, Flood Control, and Water Quality

The Chesapeake Bay Preservation Act, which created a preservation overlay on all planning districts within the Chesapeake Bay watershed, was adopted by James City County in 1990. Provisions within the plan protect all waterways, perennial streams, wetlands and upland buffers 100' wide. These buffers are natural candidates for greenways because these linear open spaces are already protected. Every jurisdiction is mandated to enforce water quality and water quantity ordinances in order to protect the health of the Chesapeake Bay, ordinances that also provide significant stormwater management functions and flood control.

The most effective natural-system management approach employs watershed-planning principles to orchestrate development and conservation efforts. A watershed is a land area that catches and transports water to a specific point. James City County is located within the Chesapeake Bay watershed that extends as far as Pennsylvania and New York. Watershed boundaries do not follow geopolitical boundaries such as state, county, and election district lines. On the contrary, most geopolitical borders are represented in the centerline of streams, making it necessary to partner with regional neighbors to coordinate conservation measures.

Every regional watershed is then divided into subwatersheds. James City County drainageways flow into the York River and James River, both subwatersheds of the Chesapeake Bay. These subwatersheds are further divided into smaller first, second, and third order watersheds, such as the Powhatan and Yarmouth Creek watersheds, in order to help implement conservation efforts on a local and neighborhood scale. By examining the environmental needs of the Chesapeake Bay, we are better able to target local initiatives that support the conservation goals of the whole.

Urbanization causes an increase in impervious surfaces, such as roads, parking lots, and rooftops that limit the grounds infiltration ability to absorb rainfall. This increases the likelihood that erosion, stream channelization, flooding, and reductions in water quality and groundwater recharge will create cumulative impacts that negatively affect a watershed. County ordinances currently require a 40% mandatory open space requirement with any new development proposal. For James City County, most of this 40% land is undevelopable due to RPA, wetlands, and steep slopes greater than 25%. These protected areas are particularly valuable as greenways if they can be connected to the protected open spaces of adjoining properties.

Additionally, each site is evaluated on water quality and water quantity needs based on a ten-point basis. Alternatives may exist in the means and manner that conservation efforts are employed. The establishment of 'proposed' off-site open space banks, to help highly developable sites achieve their ten points, creates opportunities for urbanization and conservation to occur in areas suitable for each purpose. For example, wetlands in these open space banks could be 'purchased' to mitigate wetland takings or natural areas could be 'purchased' to satisfy the 40% open space requirement.

In some cases, it may be important for County conservation objectives to protect more than just wetlands and wetland buffers. Some uplands adjacent to wetlands may provide critical ecosystem services or recreation benefits. These areas should be pursued during the site plan

approval process and acquired either as a conservation easement or a fee simple gift compensated by open space land acquisition funds.

Environmental protection benefits occur in a variety of ways. A community already engaged in conservation initiatives is better poised to capture federal and state grants that supplement local funding. The Greenway Master Plan will greatly advantage James City County in future conservation and recreation matching-grant opportunities. These grants help keep operational costs to a minimum. Some of the other benefits are detailed below.

- Silt is the single greatest pollutant in the James River. Wetlands and uplands significantly reduce silt pollution into local streams and rivers.

5.4.d.2 Promoting Ecological Integrity[64]

Where people have substantially altered natural conditions, maintaining ecological integrity requires careful design and management of many different landscape components. For greenways, which are an especially important component, moving toward this goal involves several specific objectives, which can be summarized as follows:

1. To conserve the least amount of full representation of a region's natural heritage. Ideally, this objective means protecting enough of all the various habitat types of an area to assure the continued survival of all plant and animal species that make up a region's biological diversity.

2. To design greenways that will function as a conduit for wildlife that must move from one habitat area to another.

3. To build enough redundancy (multiple movement corridors and multiple areas of the same habitat type) into greenway design to accommodate habitat change, in recognition of the dynamic nature of landscape processes.

4. To design riparian greenways with adequate dimensions to offer optimal protection of waterways by filtering contaminants and maintaining natural hydrologic regimes.

5. To engage in ecological restoration when the existing habitat network is inadequate and to account for the technical complexities of this restoration.

6. To resolve the potential conflicts between people's aesthetic preferences and the need to maintain continuous, functional greenways.

5.4.d.3 Stewardship Land Ethic

Land is often viewed as a resource commodity. Environmentalists believe the land has inherent value regardless of whether we attach a human use or value to it. "Landscapes, by definition, are complex and changing systems possessing component parts that are highly interactive." [65] A stewardship land ethic looks at the beauty and sustainability of preserving natural diversity

[64] This subsection was copied in its entirety from: Ecology of Greenways, Smith and Helmond, 1993, p.24.
[65] Ecology of Greenways, Smith and Helmond, 1993, p.xiii.

without detriment to either natural or cultural systems. By recognizing and respecting the functionality of both systems, without excluding or compromising essential attributes, we understand we are intricately woven and connected to, even part of, the dynamic known as nature.

Greenways "offer a powerful strategy for helping to maintain ecological integrity in human-dominated landscapes, especially with regard to biodiversity."[66] Greenways promote sustainability by preserving the biotic integrity of open spaces while simultaneously providing cultural benefits essential to our livability and quality of life.

The appreciation of nature and natural system dynamics continues to evoke awe and inspiration in those who marvel at nature's beauty and simplicity. This attraction to nature is the impetus behind ecotourism. Natural systems, such as greenways, assist in understanding, promoting, and sustaining our existence by allowing humans to interact with nature. As communities nationwide continue to fragment and environmental systems degrade, people are drawn toward peaceful and harmonious vacation areas with passive open spaces and greenways to recharge their spiritual batteries.

## 5.5 Educational Benefits

During the past 70 years, our society has grown increasingly more isolated from our agricultural heritage. In 50 short years, we've grown from being a mechanized society into a technologic, fast paced, global economy. Our disassociation and detachment from the land during this time has created a schism in our understanding, appreciation, and connection to the land. We used to know which farmer grew our vegetables and fruits, now we don't know which country they come from. Our basic dependence upon the land for sustenance is a remote theory, a pastime several generations removed. Fresh vegetables and fruits are now available at supermarkets grown at superfarms distributed by supertrucks across superhighways.

As a result, we have become a culture of "end-users" insulated from the knowledge that many of our resource-wasting lifestyles are having negative effects on the environment. In some respects, the very educational programs that got us here are needed to retrace our steps back toward understanding how we fit into nature. Only then will we be "enlightened" enough to comprehend the delicate balance between environmental protection and human sustainability. Greenways are uniquely poised to aid in educational efforts to bridge the gap between man and nature. However, we must understand the hierarchical world we've created in which man is over machine and machine is over nature. Our modern world continues to rely upon the errant assumption that man can tame and control nature, an assumption that has failed many engineering marvels, including floodwalls.

### 5.5.a Developing Environmental Educational Programs

Understanding how natural systems function and how greenway benefits enhance community services represent key goals of the Greenway Master Plan. For this to occur, educational programs must be developed that address gaps in our ecological information. We will never be able to calculate the entirety of our greenway actions unless we use a gestalt approach, where the

[66] Ecology of Greenways, Smith and Helmund, 1993, p.xi.

whole is superior to the sum of its parts. Greenways must be viewed in their entirety, neither as a formulaic approach that resolves problems, nor as theoretical constructs that chase shadows lacking substance. The whole notion of "greenway" is based on connections and as such relies upon the successful application, or integration, of science, theory and design stressing both positive attributes and the mitigation of negative attributes as well.

In some respects, public education is made harder because we have lost our connection to the land, and therefore find it difficult to describe the essence of landscape without benefit of experiential information. While we may understand the effects of pollution are bad, our culture remains detached concerning who is really causing it and how to participate in correcting the issues. Cars are essential to our daily lives and cannot be encumbered by exhaust emission regulations, catalytic converters, ozone depletion, oil spills, mountains of discarded rubber tires, wilderness oil drilling and off-shore platforms, planned obsolescence with 10-year life cycles, created wetlands to handle roadway drainage ditches, and non-renewable energy consumption.

Greenway educational programs must be diverse and provide information that is scientifically factual and responsibly applied. Environmental education programs that were taught to our children during the 1960's and 1970's resulted in clean air and clean water regulations. The 1980's gave us endangered species protection and the 1990's gave us recycling. The next step in environmental education for the 2000's is landscape preservation of open spaces to protect natural system dynamics.

5.5.a.1 Williamsburg/James City School Programs

Educating our children is the fastest way to educate all generations. This information is transmitted through our families, hence our culture, at an unprecedented rate. Internet access, digital libraries, videos, and remote campus lectures advance many research projects, even among our youngest scholars. Local and state curriculum standards require schools to develop comprehensive environmental programs. Several schools have constructed outdoor learning classrooms to reinforce practicum-learning experiences in the K-5 Resource Stand. Greenways can greatly assist in this regard by providing landscape-scale classrooms for our students.

Consciously or not, our society has distanced itself from the land. This disassociation dilemma has resulted in weakening the human/land interrelationship from the experience of "landscape." We've become passive observers, rather than active participants, of the changes going on around us. The experience of working with the land as a form of livelihood to provide sustenance is rapidly disappearing. Practicum classrooms could be devised to integrate a broad understanding of natural processes including mankind as a component of nature, since humanity now has become one of the ten forces of nature with the ability to influence natural events on a global scale. If we continue to learn these truths only from books, we exacerbate the disassociation dilemma. Students must personally learn this experientially. Environmental education is most effective when it translates large-scale impacts into personal applications, for in this personalized realm is it made real.

- Within the past ten years, over 90 schools have started "ecological schoolyard" programs to teach students about sustainability, food production, resource conservation, and ecological design. In LeConte Elementary School in Berkeley, California, the children's time in the garden is tied to the curriculum and to nutritional education goals established by the

California Nutrition Network. The Rowe Middle School in Milwaukee, Oregon is a "Naturescape" haven for wildlife and students. Students are able to understand the ecological cycles in their midst and learn about ecological design through direct implication.[67]

- Oak Ridge Farm, located approximately 30 miles west of Milwaukee, Wisconsin, is an actual 200-acre "working farm" with large animals, moving machinery, and a barn with dairy operations. Children experience first-hand farm life up close, with opportunities to touch many of the animals, harvest crops, churn butter, make hand-dipped beeswax candles, bake bread, even see a hen that lays green eggs. Participants gain a new knowledge of the animals that are raised on farms and the crops that must be raised to feed them. The participatory aspects of this experiential classroom help create associations between humans and the land.

5.5.a.2 Distance Leaning Centers

Schools can use greenways as outdoor classrooms. Many of our schools already have nature trails on school grounds for this purpose. They are uniquely linear and can easily adapt to linear educational processes with didactic and interactive experiences providing deeper levels of scholarly interest in upper grade levels. It may be that greenways are just the educational connection needed to stimulate interest within some students. If every school division on the Peninsula were to create multiple outdoor education classrooms, living nature museums, schoolyard ecosystems, and learning gardens, we could create a network of outdoor classrooms with remote campus opportunities. In doing so, regional water and energy conservation issues become challenges for home experiments, not problems for political institutions to resolve.

5.5.a.3 William and Mary Mentorship Programs

Opportunities for college students to provide learning experiences for elementary and high school students can be incorporated into a course syllabus. Conducting experiments at test facilities to monitor environmental changes along greenways would greatly advance our knowledge and understanding of cultural influences on natural systems and ecological processes. Environmental Clubs can develop service opportunities including outdoor workshops for schools and school clubs. Greenway mentoring coops could provide programs that create tangible connections between generational gaps in our educational institutions.

5.5.a.4 Community Civic Programs

The Williamsburg community is richly blessed with numerous civic groups concerned about environmental protection and growth management issues. Opportunities for advocacy and public education exist when organizations like the Williamsburg Land Conservancy, the Friends of the Powhatan Creek Watershed, Visions, Colonial Soil and Water Conservation District, 4-H Clubs, and Cooperative Extension, whose membership programs engage policymakers to solve societal problems and enhance community services. Outreach programs like the Junior Land Conservancy reach past age barriers to address ways all members of society can be part of the solution.

Community civic programs are valuable assets in the following areas:

[67] Landscape Architecture Magazine, January 2002, Sharon Danks, p.37-40.

- Ongoing research and monitoring. The Friends of the Powhatan Creek Watershed is very active in monitoring stations to determine if any negative influences are affecting the Powhatan Creek watershed. Conducting research to assimilate data aids in developing benchmarks that track whether we are making any progress to conserve natural resources.
- Community Environmental Networks. Nearly every environmental group endorses greenway planning. Bringing all environmentally based civic groups under one tent to share ideas, strengthen partnerships and create new alliances is a proactive goal. The Virginia Conservation Network is a similar organization operating on a state level. The key goal here is advocacy in a collective voice. The current Board of the Williamsburg Land Conservancy is working towards this goal.

## 5.6 Quality of Life Benefits

Greenways embrace, more than any other planning instrument, the collective quality of life benefits communities are striving to achieve. James City County citizens understand the pivotal place our community occupies in American history. They also understand the richness of our natural beauty continues to draw visitors from around the country. So, with such a weighty national obligation, how do we begin protecting the quality and character of the community-at-large? Satisfying local expectations as well as national interests mandates we should endeavor to preserve our cultural way of life as much as possible.

### 5.6.a Enhance the Quality of Life

James City County enjoys being one of the highest quality of life communities in the nation. Sound economies, wonderful climate, local attractions, rich culture and history, beautiful scenery, picturesque environments, expansion opportunities, traditional communities, quality schools, low taxes, generous parks and open spaces, and proximity to major metropolitan cities make James City County a wonderful place to live. While there are many positive attributes, citizens have repeatedly requested growth management, and the preservation of open spaces and natural resources, as planning elements needing improvement. Citizens prefer the "small town, traditional" atmosphere of the Williamsburg area and they apparently want to keep it that way. Protecting critical environmental areas, providing interconnected neighborhoods with bikeways and greenways, enhancing roadway corridor aesthetics, and minimizing suburban sprawl have risen to the top of the community wish list, as demonstrated by community forums, website data, and the recent 2001 Comprehensive Plan survey.

"Because open space and leisure activities are important to quality of life, planning in the urban context must include the availability of a variety of recreational experiences. Since major state and regional park systems, which offer large areas of open space and natural area experiences, are not typically located in urban settings- greenways, urban open spaces, and stream valleys can be blended into systems to meet some of the demand for natural and passive areas in urban settings." [68]

[68] Virginia Outdoors Plan, 1996, p.295.

5.6.b Community Visioning

The most obvious outcome from citizen comments during the focus group meetings reflected an overwhelming support for greenways as a positive factor influencing their quality of life. Equally obvious were comments requesting tangible governance mechanisms to produce measurable results. Recent JCC Comprehensive Plan results from citizen surveys found that 86% of our citizens requested more hiking and biking trails; similar results were found with respect to green-space protection and historic preservation. [69] The greenway vision embraced over 10-years ago has now become a mandate for the acquisition and development of more greenway facilities. But what will the future bring?

Survey after survey rate towns and cities with livability criteria to determine the best places to live in America. Repetitive terms such as scenic, beautiful, breathtaking, peaceful, fun, exciting, clean, and friendly are woven into every description. Also mentioned in highlighted fashion are proximity to prominent recreational facilities and parks. When people think about quality of life, recreation amenities rise to the top of the discussion. Our community has a very high percentage of parks and natural areas within a 12-mile radius of Colonial Williamsburg, perhaps more than most American communities.[70] Our parks and recreation programs have resulted in countless state awards, including four successive national Gold Medal Award nominations, an honor reserved for the top four programs in the country. With such an abundant wealth in parks, recreation, and open space, we should consider maximizing our resource potential and expand our tourism base by marketing greenways and trails to visitors desiring ecotourism vacations. The Crossroads Vision of making Williamsburg the most pedestrian friendly city in America is doable. Linking all our parks, historic sites, and natural areas through interconnected greenways and trails represents an ecotourism and heritage tourism goldmine waiting to be opened.

Our community is also blessed with an incredible amount of natural beauty. It is also doable to make our community the most beautiful place to live in America. However, little in the way of landscape enhancement is put toward our roadways and streetscapes. Imagine greenways with wildflower meadows and perennial gardens at all our major roadway intersections. Imagine further driving down tree-canopied streets with native trees and shrubs blooming all season long. Consider how median strips and streetscape plantings produce traffic calming affects on drivers. Imagine commercial establishments investing substantial funds to improve curbside appeal with annuals, perennials, and other flowering plants, even to the point of reducing some of their visibility from the road. Developing a comprehensive landscape enhancement program with sufficient funding mechanisms, coupled with private investments and/or tax incentives for civic beautification, could stimulate a Garden City renaissance in Williamsburg.

The majority of our citizens want our community to stay beautiful. They want environmental conservation, open space preservation, and protection of our cultural heritage. They want excellent schools, managed growth, conservative financial and governmental programs, scenic roadways, and public parks. All these are capable within the scope of greenway planning. The investment of local funds for greenway planning has already demonstrated a positive benefit to the community as the first wave of green infrastructure.

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[69] James City County 2001 Comprehensive Plan Survey, VA Tech Center for Survey Research, p.10 & Appendix D.
[70] National Parks- 3, State Parks-3, Regional Parks- 5, District Parks-2, Community and Neighborhood Parks- 18+, Wildlife Management Areas-3, Scout Camps-3, Golf Courses- 10, W/JC Schools- 12, plus other private facilities.

The opportunity to create a special place in Williamsburg was done 70 years ago. The opportunity to enhance this special place begins with a community vision larger than previously imagined. It begins with community enthusiasm to be the best, most beautiful, and livable community America has yet to see. We have the tools and capability to make this vision a reality; now we need to implement.

### 5.6.c Greenways- The Fabric That Makes Us One

When we think about "community," an idea of "oneness" emerges. Programs like the United Way rely on the character strengths of a caring community to build upon and improve the qualitative community experience. These programs connect community services and private resources to enhance the life and vitality of the "whole" community. Building upon this example, greenways also connect people to community services and environmental resources that enhance their quality of life.

Greenways can be described metaphorically as a woven fabric. Some of our development patterns during the last 50 years have created seams and tears in our community fabric. The fibers running in crisscrossing directions represent a matrix of different programs, community services, character ideals, and shared visions all woven into one quality of life fabric. Greenways are capable of creating and strengthening network connections between these crisscrossing fibers and may even create new fabric where the fibers are torn or frayed. Greenways tie together many loose ends by "Working in partnership with all citizens to achieve a quality community." Greenways reconnect us in many ways, but most of all they connect us to each other into a community "oneness."

The majority of protected open spaces capable of supporting greenway systems are normally located around the property perimeter or property line. These quality open spaces are typically unavailable for the use and enjoyment of those residents living adjacent to these open spaces due to fences and contiguous private property borders. Providing connections through these properties and subdivisions will help reestablish some of our community connectivity. Whether these connections are adjacent to or through a subdivision, or along a stream corridor, connections need to be provided so that residents can freely move about their community to visit friends and family, and to enjoy the great outdoors.

In some cases, access to potential greenways is now being provided at cul-de-sacs to encourage connectivity within neighborhoods and between neighborhoods that were once restricted. Changes to the zoning ordinance should reflect these planning strategies during future site plan approvals. Access to open spaces for passive recreation is a privilege that should be preserved for future generations. Partnerships between citizens, neighborhoods, developers, corporate entities, and governing bodies will enhance the "oneness" quality of life in our community through cooperative ventures to create a greenway fabric throughout our County.